

# Weapon Systems Technical Architecture Working Group (WSTAWG)



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# What the WSTAWG is...



## Weapon Systems Technical Architecture Working Group (WSTAWG):

- A Consortium of Industry and Government
- With The Mission To Define Additions And Alternatives To The Joint Technical Architecture – Army (JTA-A)
- Consistent With Technical Architecture Objectives
- For All Army Weapon Systems
- Focused On Interoperability





# Distinctions Between IT Systems and Weapon Embedded Computing Systems

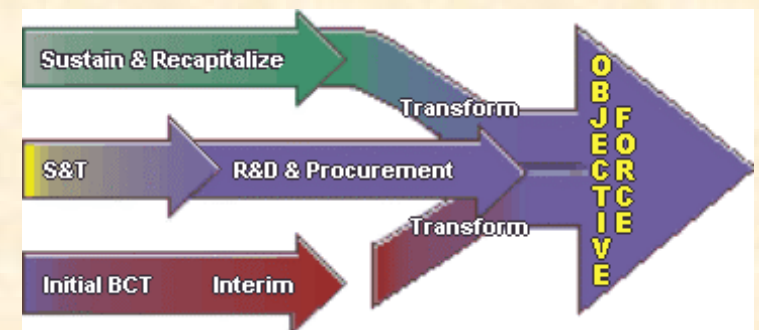
Design Factor	Information System Development Process	Weapon Embedded Computing Development Process
Objective	To Inform	Lethality and Survivability
Essential Considerations	Multipurpose information processing computer, generic hardware	Single purpose computer, meets mission requirements within physical constraints
Approach	Populate databases and provide user friendly access	Distributed modeling of system elements
Implications For A Domain's Technical Architecture	<ul style="list-style-type: none"><li>- Supports a high degree of modularity</li><li>- Allows focus on software</li></ul>	<ul style="list-style-type: none"><li>- Modularity desirable but difficult to achieve</li><li>- Strong weapon requirements focus</li><li>- Strong software/hardware link</li></ul>



# What WSTAWG Does for the Army...

**Goal:** Cost effective interoperability & performance of all Army Weapon Systems in a Common Operating Environment.

- “Go-to-War” Capability
  - “Plug and Fight” – rapid insertion of new technologies
- Affordability
  - Promotes Open Systems
  - Maximizes use of commercial standards, COTS
  - Software modularity and reuse
- Interoperability
  - Accurate/Understandable Exchange of Information
  - Standardized formats of transmitted data
  - Skin to Skin Interface Standards
- Supportability
  - Reduced developmental risk
  - Emphasis on utilizing the COE concept



***Supports interoperability of legacy, interim, & objective forces throughout the Army transformation campaign.***



# WSTAWG & JTA-Army



## Joint Technical Architecture – Army (JTA-A):

- JTA-A is the Army's implementation of the JTA.
- Governs how systems are built for seamless interoperability using common building blocks (standards & interfaces).

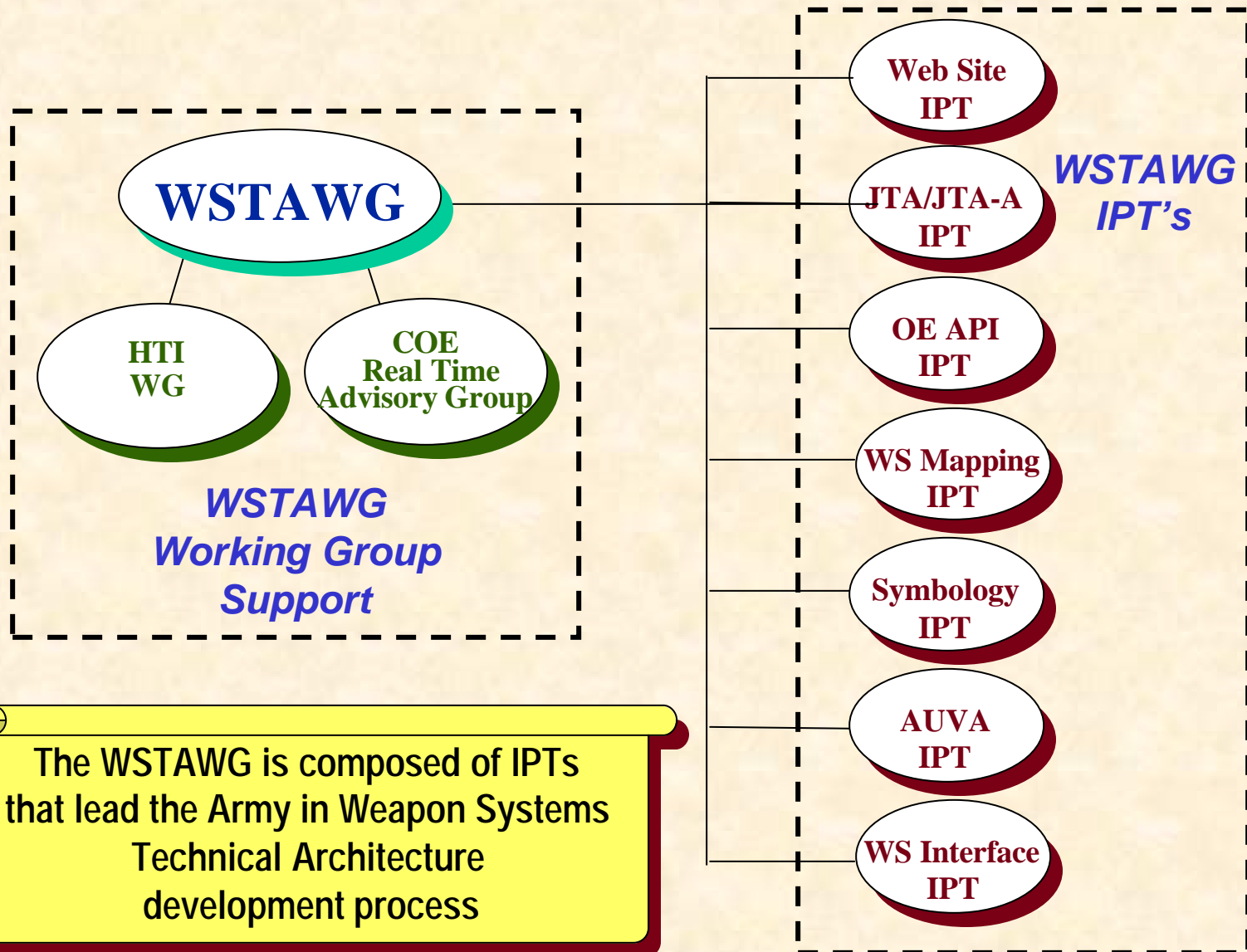
## WSTAWG:

- Provides specific weapon system context to the JTA-A.
- Stands-up IPT's/working groups to identify, develop, & maintain Army weapon system APIs and standards.
- Designers and maintainers of the Common Operating Environment specifically focused on Weapon Systems (WSCOEE).

***Facilitates cost/time savings associated with software block upgrades and system development/enhancements.***



# WSTAWG Composition...



# Operating Environment IPT

- **PRODUCT:** Version 2.0 published 10/1/01  
Version 3.0 Under development
- Implementation used on MLRS program
  - Incorporated OE in solicitations of several FCS related projects including Crew Interface and Automation Testbed and Robotic Follower
    - Support the development of real time embedded applications in a heterogeneous distributed real time environment
  - Pursue commercial Standardization through IEEE, Open group and OMG





# Mapping IPT

## PRODUCTS:

- WSMS API Version 1.1 - April 30, 1998
- MDLS Version 1.0 - February 26, 1999
- Reference Architecture - December 23, 1999
- WSMS API Version 1.2 - January 28, 2001
- WSMS API Version 2.0 – January 2002
- Verified TSI WSMS 1.0 Implementation

- Reduce acquisition and maintenance costs through common map procurement.
- Define Products in Accordance with WSTAWG Framework.
- Incorporate aviation requirements into WSMS API in order to support commonality across ground and aviation map systems.
- Develop New Items in Accordance with Open/Emerging Technologies.
- Support various Real-Time Mapping Working Groups.



# Autonomous Unmanned Vehicle Architecture IPT



- Exploring excursions in Architectural designs for autonomous vehicles (ground and air).
- Capture technical architecture standards
- Support Congressional Mandate to be 30% Robotic by 2010
- Develop life cycle architectural considerations.
- Lower Development Risk for PMs Developing Unmanned Systems which Interoperate
- Support Future Combat System (FCS) & Objective Forces (OF) Heavy Reliance on Unmanned Vehicles



# Symbology IPT

Extend MIL-STD-2525  
Symbology for use by all DOD  
elements

Participate in the Army  
Symbology Working  
Group

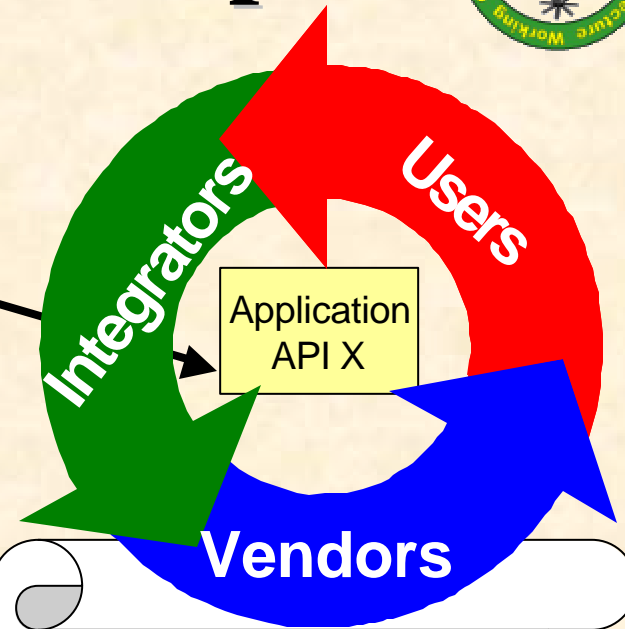
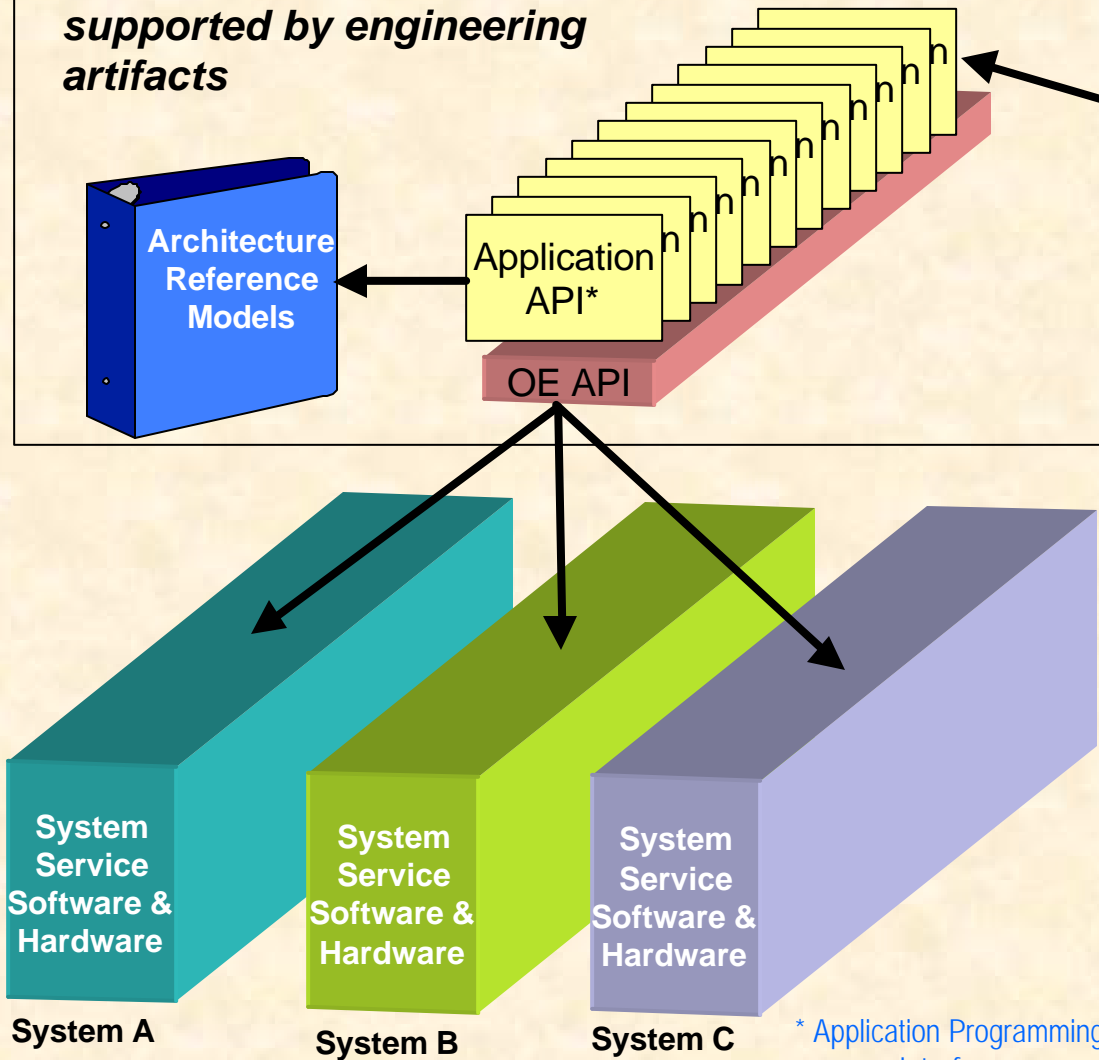


Enhance survivability with  
improved identification to  
reduce potentials for  
fratricide.

Develop unique engagement  
operations symbology for use  
on weapons platforms

# WSTAWG's WSCOE Concept

**WSCOE - a framework of Interface Standards supported by engineering artifacts**



## Software Acquisition Process Innovations

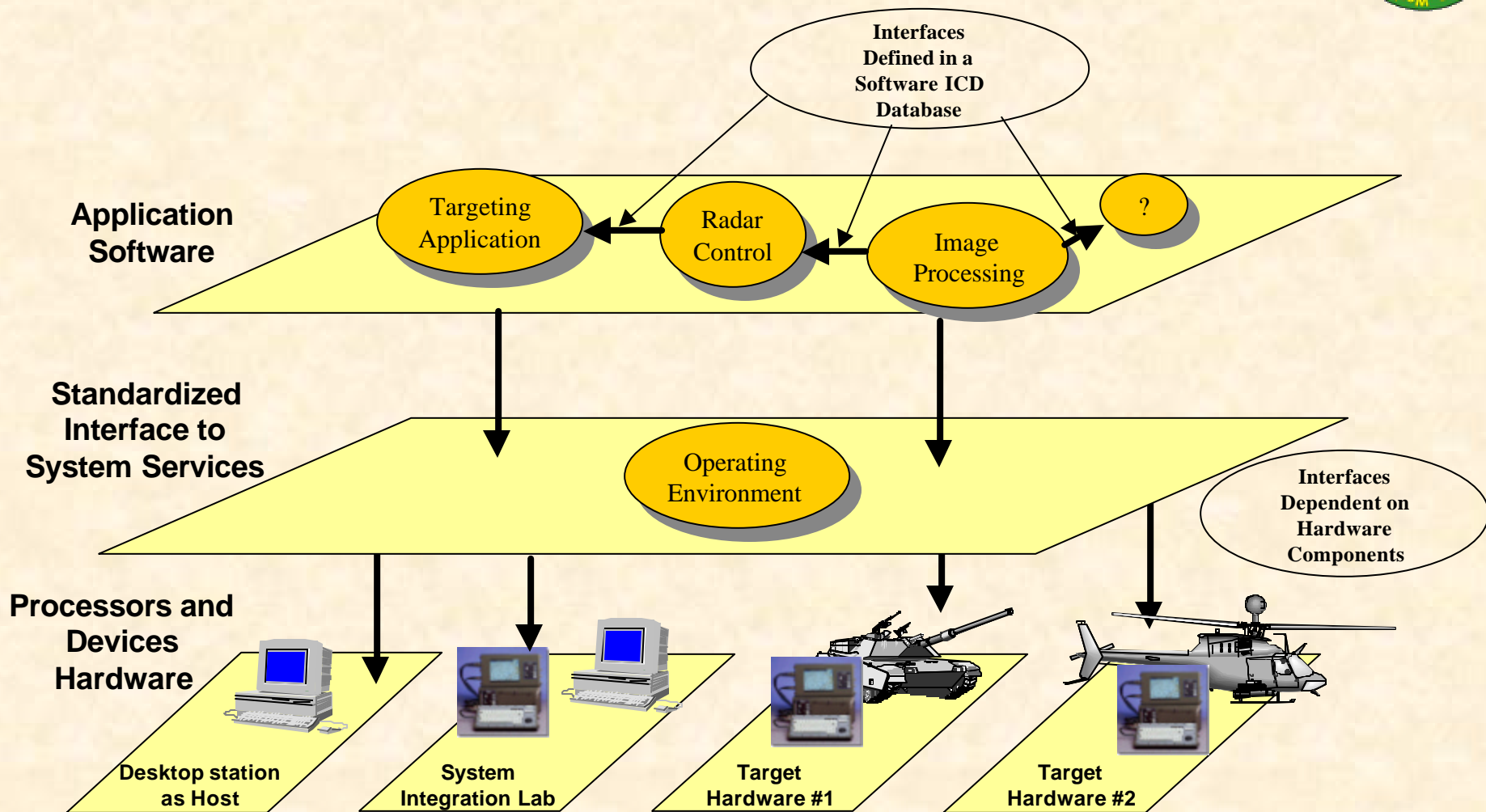
- Software API maintained by Users Group
- Software maintained by vendors
- Second tier software supplier base
- Users acquire software via vendor license
- Competition through the life cycle



# WSCOE Definition

- **Army Definition of Hard RT/Embedded “WSCOE”:**
  - **A Framework of Interface Standards supported by Engineering Artifacts**
  - **Not a software product**
- **A software infrastructure that supports:**
  - **Embedded processing**
  - **Reuse and rehosting**
  - **Platform independence**
  - **Developer flexibility**
  - **Scalability**
  - **Heterogeneous environments**
  - **Interoperability**

# WSCOE Concept



***Open Architecture Enables Software Reuse, Parallel Development, Successful Integration, Upgrades***

Source: Raytheon

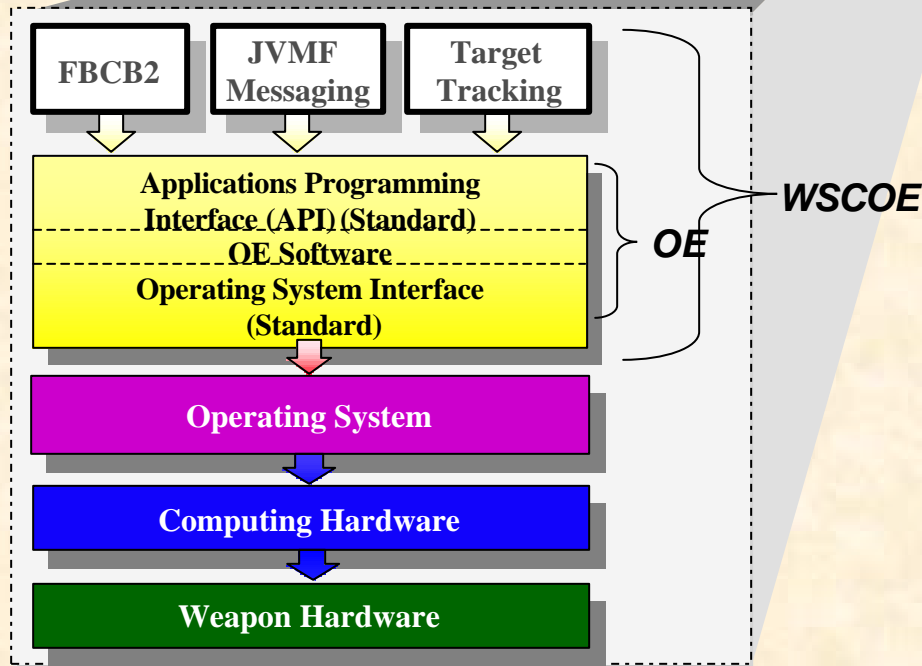
# WSCOE Concept Realized



LOSAT FBT



Feature Based Tracker (FBT)



Predator Equipped with Hellfire Missile





# Evolution of WSCOE

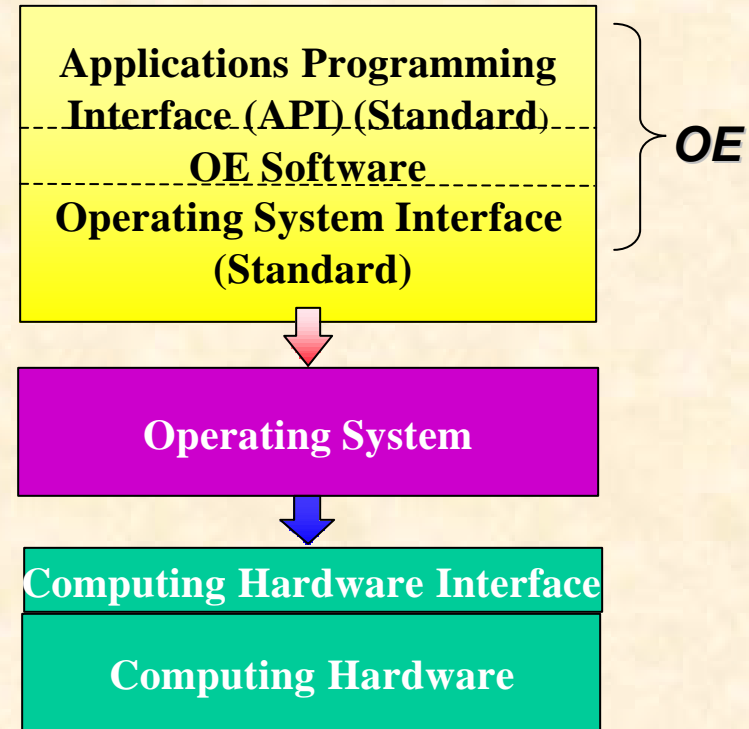
## Legacy OE

Middleware between the application software and operating system/hardware

- Provides easy mechanism for software developer to reuse application programs on different platforms
- Resides on host operating system
- Hides details of processor hardware and operating system from applications
- Extends functionality provided by operating system alone (POSIX)

### WSTAWG OE API

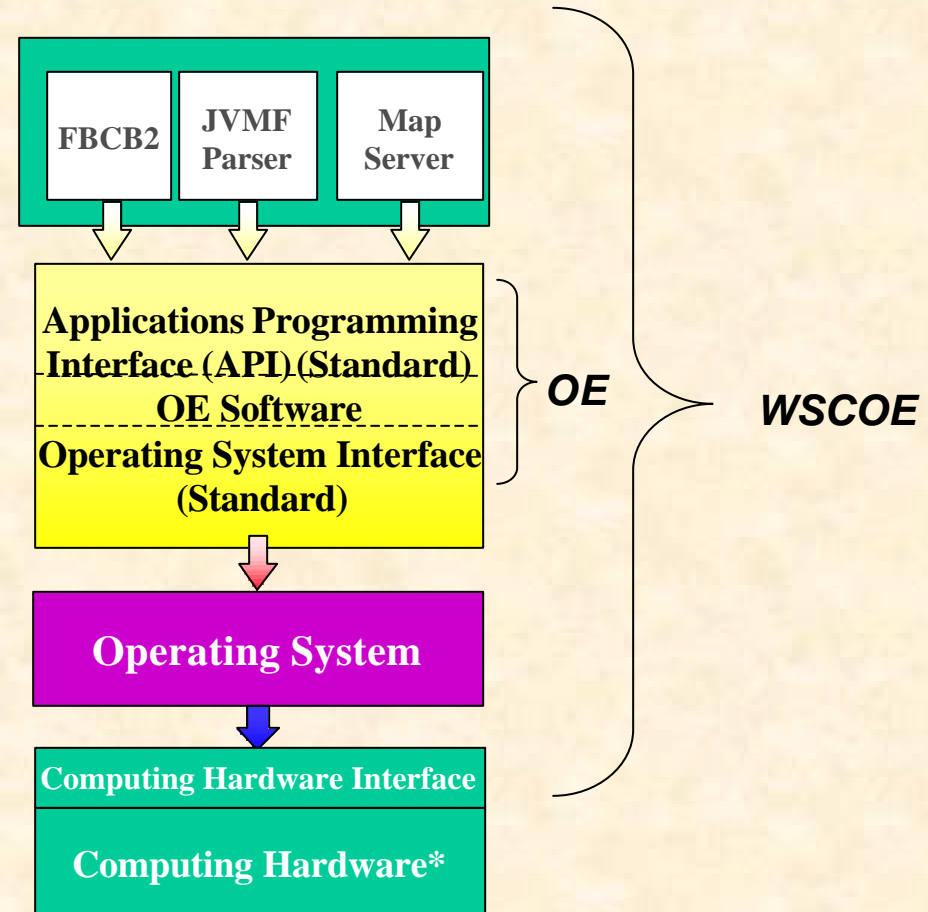
- Standard Interface to set of distributed objects
- Provides common set of services
- Language independent
- Tailorable to application specific requirements



# Evolution of WSCOE

## Interim

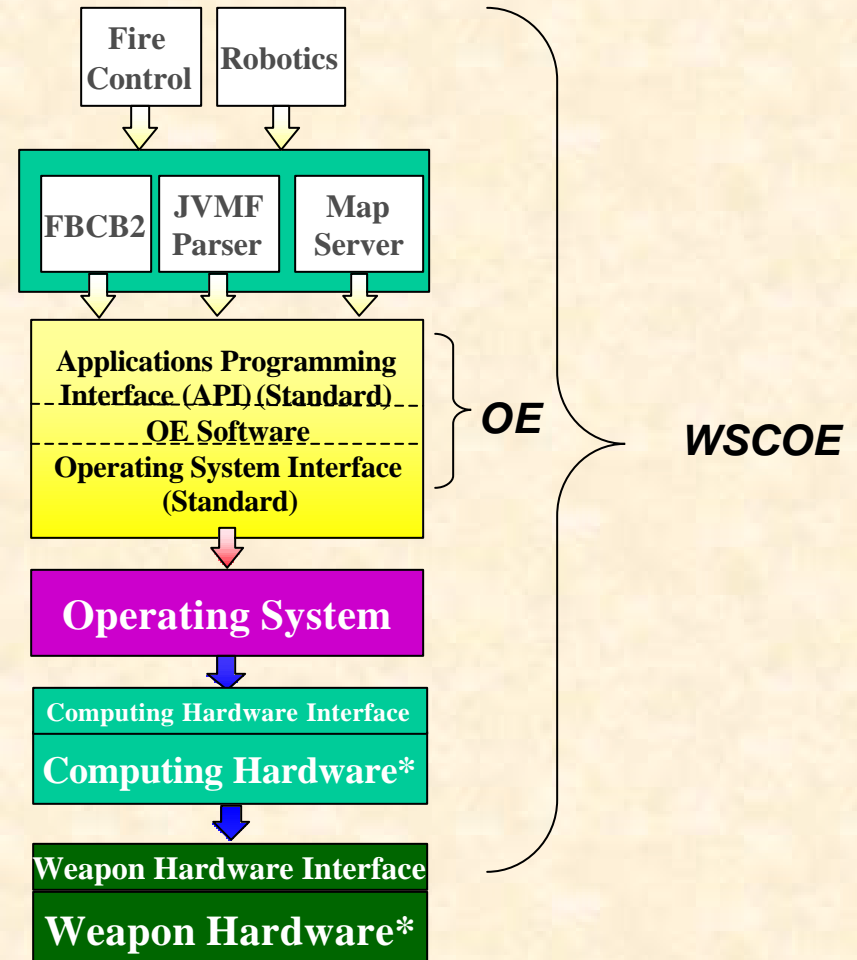
- Incorporates WSTAWG OE
- Includes military software applications



\*WSCOE includes standardized interfaces to hardware, but not the hardware itself

# Evolution of WSCOE Objective

- Encompasses entire stack
- Incorporates WSTAWG OE
- Incorporates Existing OE Applications/Services
- Includes Objective Force Applications



\*WSCOE includes standardized interfaces to hardware, but not the hardware itself

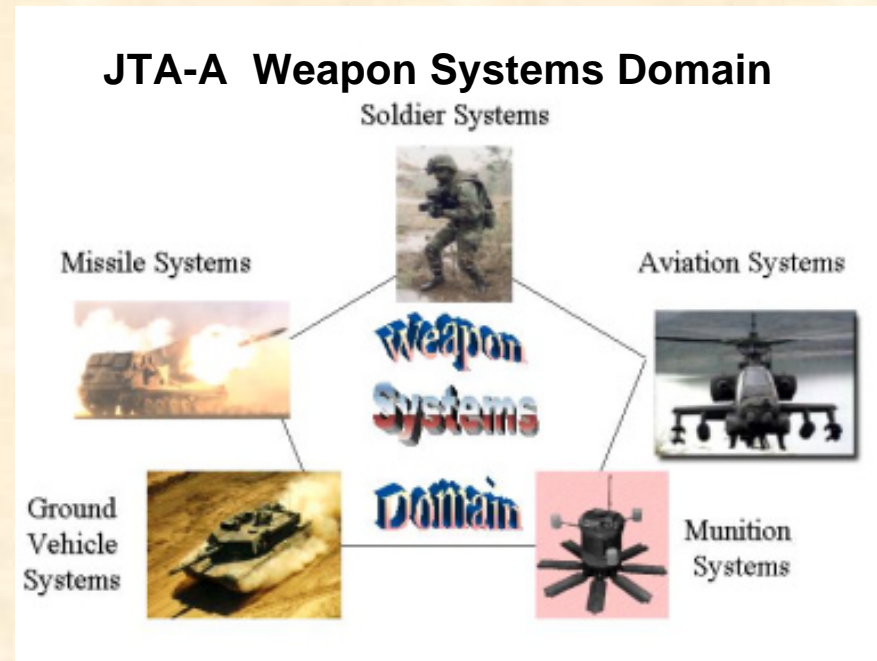
# WSTAWG (Planned/Projected Activities)



- **Future API Development**
  - **C2/FBCB2**
  - **COE Soft RT to Hard RT/Embedded Interface(s)**
  - **Fire Control**
  - **Embedded Simulation**
  - **Speech Recognition**
  - **Combat Vehicle SMI Tool Kit**
  - **Display Manager**
  - **Autonomous Mobility Suite**
  - **Driver's Associate**
  - **Stores Management**
  - **Active Protection**

# Conclusion

## *WSTAWG Serves the Army Weapons Community*



*Building the Technical Architecture infrastructure for interoperable, affordable, and maintainable Army Weapon Systems while providing critical capabilities.*